

Protecting Watersheds Through Water Reduction and Treatment Plant Improvements

Presented by:

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History of Industrial Wastewater Treatment

1977

- **Constructed centralized WWT Facility; metal finishing and plating wastewaters**
 - **Acid/alkaline rinse**
 - **Concentrated acid/alkaline**
 - **Cyanide**
 - **Hex Chrome, etc.**
- **EPA issued original NPDES Permit; BAT criteria**
 - **treat metal to ppm range**
 - **0.5 MGD to surface; 0.1 MGD to POTW**

1982 – 1985

- **Negotiated NPDES permit renewal; Water Quality Criteria**
 - **Designed advanced unit operations**



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Chartley Pond

Coopers Pond

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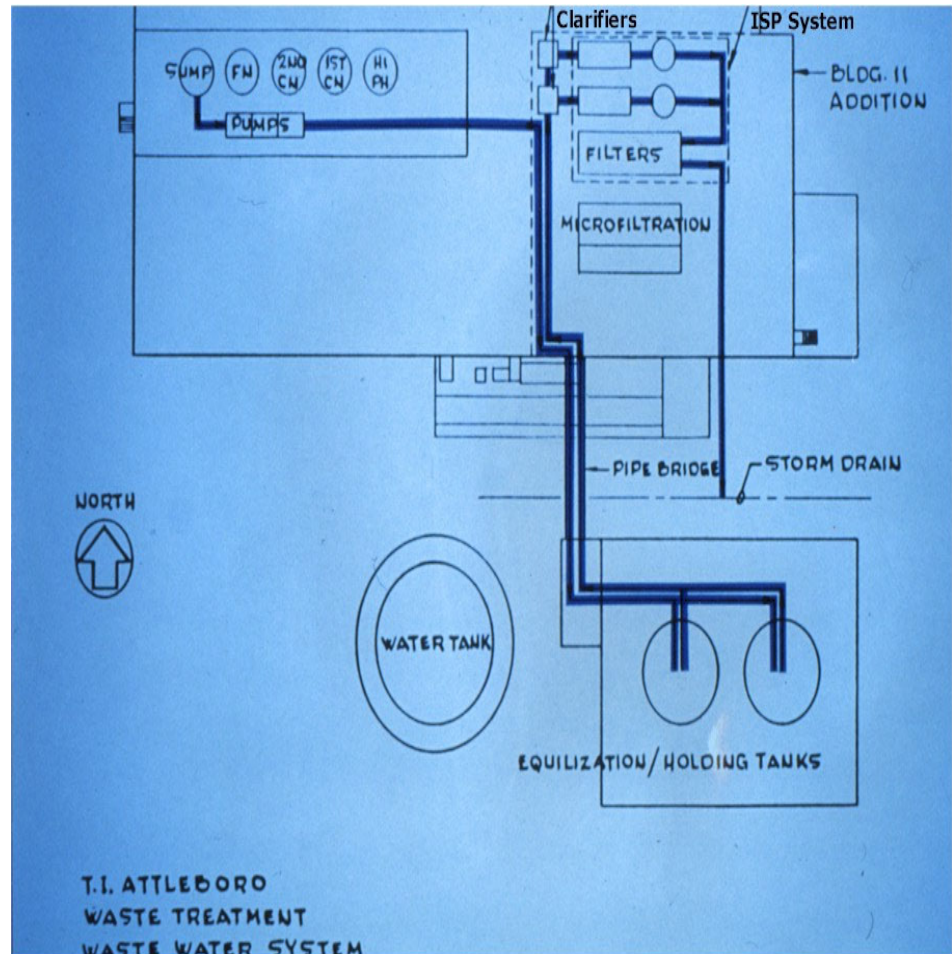
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**THE BUSINESS
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History of Industrial Wastewater Treatment

1985 - 1987

- **Constructed WWT addition**
 - \$10 M Capital
 - \$3M annual operating cost
- **Capabilities:**
 - 0.7 MGD to surface
 - 0.1 MDG to POTW
 - treat metals to ppb range
- **Added unit operations after pre-treatment**
 - flow equalization/holding
 - lamella clarifiers
 - insoluble sulfide precipitation
 - multi-media filters
 - microfiltration
 - plate & frame filter press
 - redundancy & automation



History of Industrial Wastewater Treatment

1997 - 2000

- **Business divestitures and conservation reduced flow to WWTP**
 - **Fixed costs redistributed to remaining high volume dischargers**
 - **Destabilized financial budgets of users**
- **Formed WWT Optimization Task Force**
 - **Stretch Goal: Reduce annual operating cost from \$3M to <\$1M.**
- **EPA initiated permit renewal negotiations**
 - **Starting point; 1992 draft permit**
 - **Modifications; site specific criteria of receiving waters**

Select NPDES Permit Equivalency Discharge Limits (mg/l)

Parameter	1985		1992 Draft	
	Avg.	Max.	Avg.	Max
Aluminum	1.0	1.25	0.016	1.2
Copper	0.15	0.15	0.012	0.015
Lead	0.031	0.15	0.0024	0.054
Silver	0.007	0.05	0.00022	0.002

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WWT Optimization Strategy Initiated in Year 2000

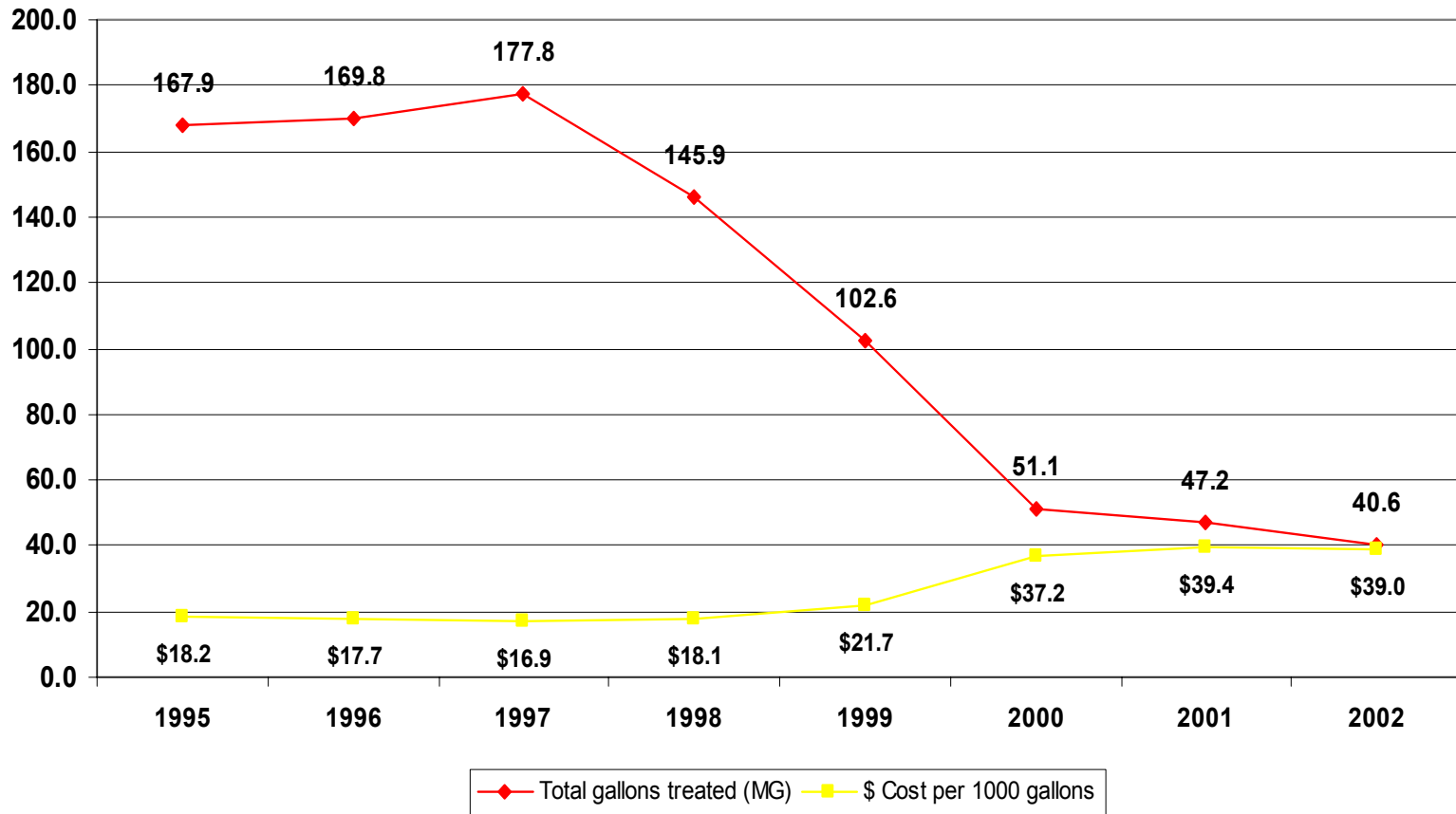
- **Point of Use Water Conservation within manufacturing operations**
 - Further reduce flow to meet POTW discharge capacity limits
 - Eliminate need for NPDES permit and associated liability
 - Avoid cost of permit renewal
 - Site specific criteria evaluation (~\$100K to \$500K)
 - Capital cost of WWTP upgrade (~\$1M)
 - Incremental increased annual operating cost (~\$100K/yr)
- **WWTP modifications to reduce annual operating costs**
 - Eliminate costly Memtek ® microfiltration unit operation
 - Optimize treatment chemistry
 - Redirect all flow to Sulfex ® Insoluble Sulfide Precipitation System
 - Reduce shift coverage
 - Lower cost of labor
- **Negotiate flexible NPDES Permit renewal (March 2000)**
 - Allow continued operation under 1985 discharge limits during transition
 - Allow one year to secure and implement POTW discharge
 - Additional two years to resume surface discharge if POTW infeasible
 - Failure to sustain POTW discharge triggers one year deadline for site specific criteria evaluation at receiving waters

Point of Use Water Conservation Projects

- **Continuous Strip Electro-Plating (43 MGY reduction)**
 - Process change – immerse contact in chemistry; eliminate rinse stations
 - Multi-stage drag-out tanks
 - Flow reducing nozzles
 - Cascade rinsing
- **Batch Parts Electro-Plating (31 MGY reduction)**
 - Metering
 - Timed valves on rinse stations
- **Continuous Strip Surface Cleaning (10 MGY reduction)**
 - Metering
 - Repair leaks
 - Re-use scrubber water as rinse make-up
 - Interlock rinse water to equipment operation
- **Batch Parts Surface Cleaning (6.5 MGY reduction)**
 - Metering
 - Filter and recirc concentrated baths
 - Filter and recirc rinse water
 - Control rinse water make-up with conductivity probes

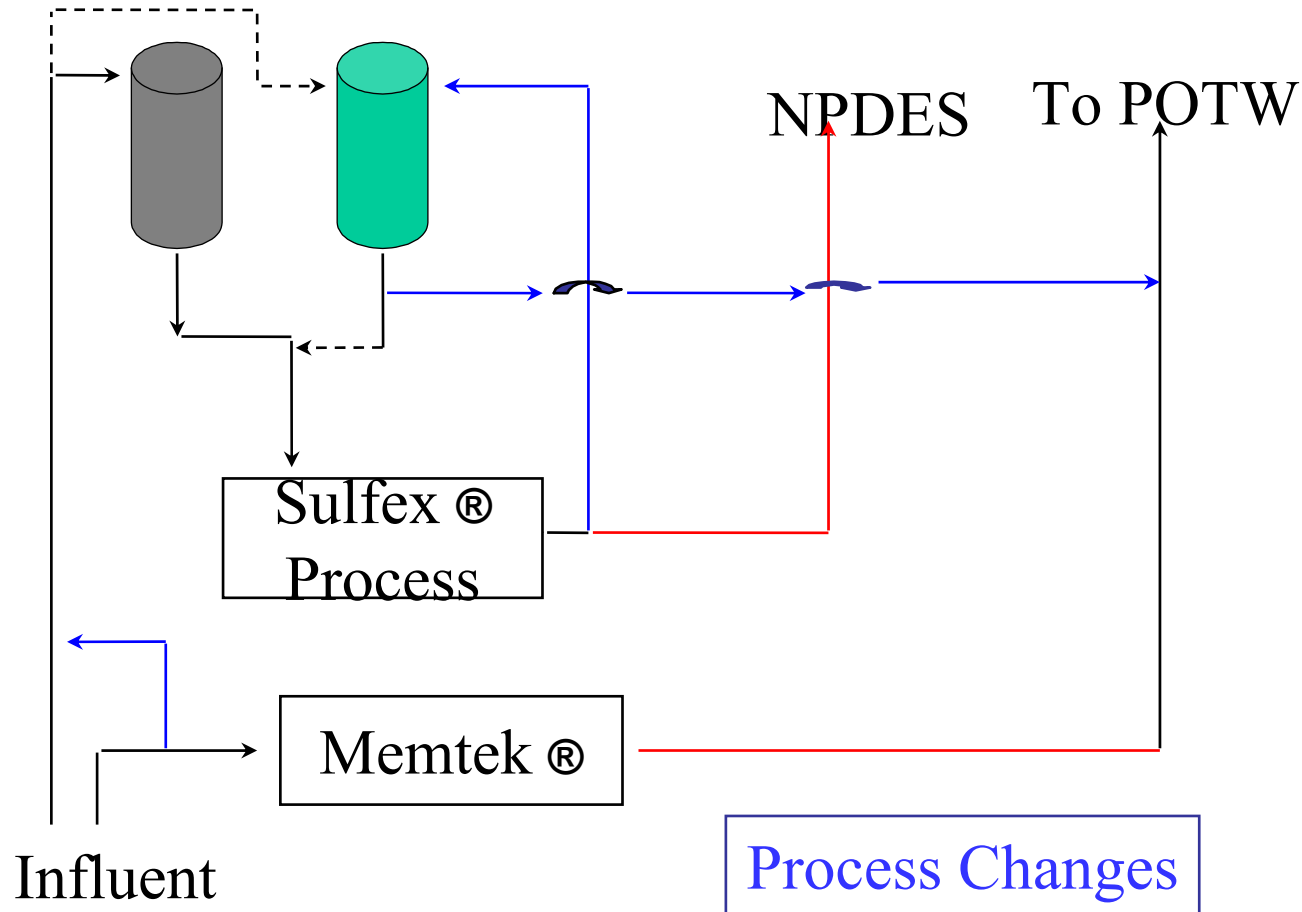
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Total Treated Flow/Treatment Cost



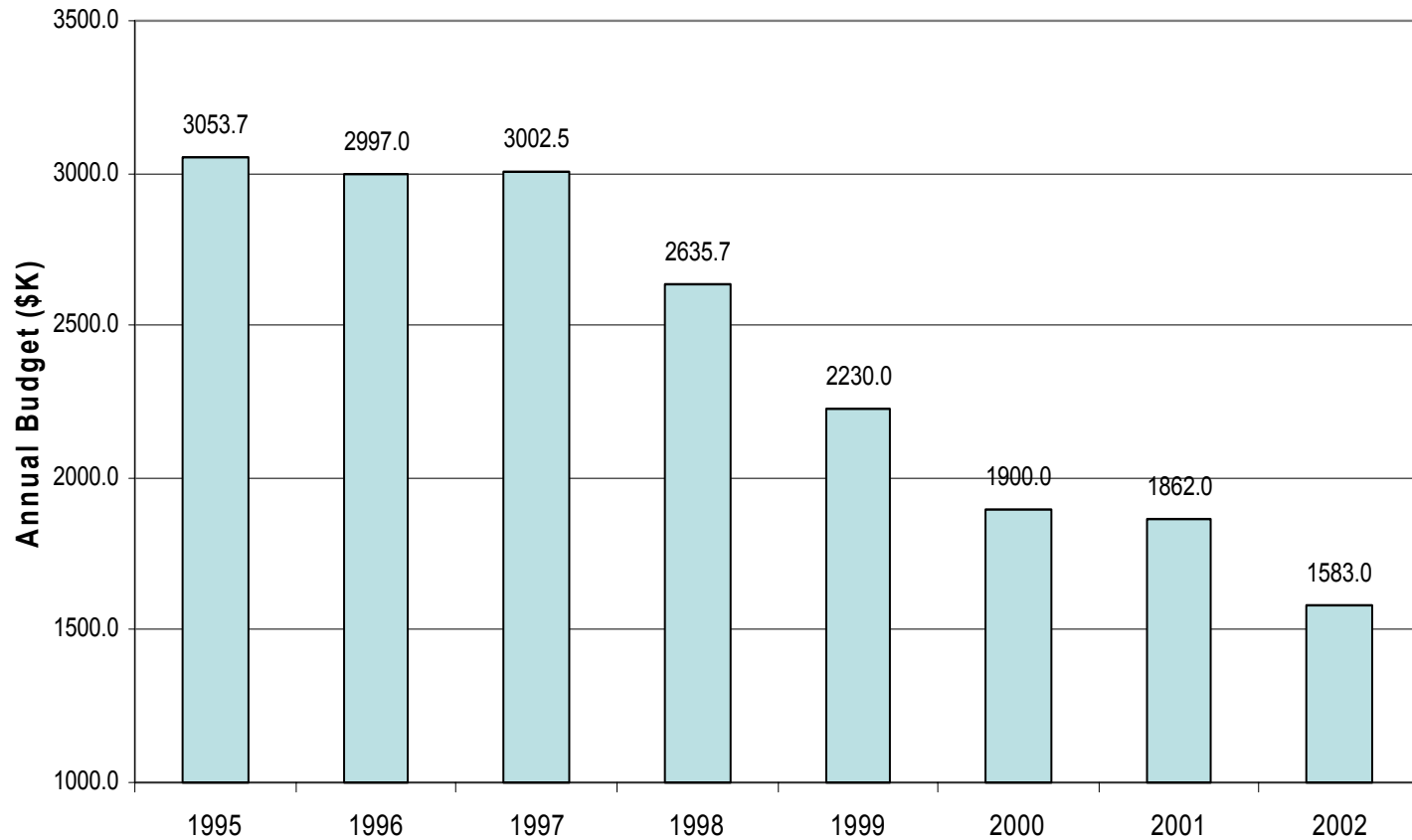
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WWTP Modifications to Reduce Annual Operating Costs



**THE BUSINESS
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Annual Operating Budget



Outcome of WWT Optimization Program

- **Reduced discharge of treated wastewater from 175 MGY to 40 MGY**
 - Point of use water conservation projects
- **Reduced annual operating cost of WWTP from \$3M to \$1.5M**
 - Process Modifications in WWTP
 - Shift modifications
- **Negotiated NPDES permit renewal**
 - Allowed flexibility during transition to POTW discharge
- **Eliminated surface water discharge to Taunton River Watershed**
 - Re-directed all treated effluent to POTW (Ten Mile River Watershed)
 - Eliminated potential liability of NPDES Permit violation
 - Avoided cost of Site Specific Criteria Evaluation at receiving waters
 - Avoided cost of WWTP upgrade and increased operating costs
- **Declared wastewater reductions as one example of conformance to EPA Performance Track Criteria**